

# **PERMIT BOILERPLATE PROCEDURES**

## **FOR CONCRETE BATCH PLANTS**

### **I. PURPOSE**

The purpose of these procedures is to specify the requirements for permit applicability and approval for concrete batch plants. These procedures are meant to provide guidelines for the minimum requirements of the Department of Environmental Quality when developing a minor new source review (NSR) permit using the concrete batch plant boilerplate conditions document (“boilerplate”).

These procedures do not apply to PSD, nonattainment, or state major permit reviews. For PSD facilities and nonattainment reviews, additional analyses (such as quantification of PM and fugitive emissions) are required. These procedures do include guidance on requirements for cement and cementitious material (e.g., flyash, blast furnace slag) storage silos typically found at concrete batch plant facilities but do not provide guidance for other emission unit types (e.g., crushers, stationary diesel powered electric generators, hot water heaters) that may be located at concrete batching plants. Any such units should be evaluated on a case by case basis using other boilerplates or guidance as appropriate.

### **II. REFERENCES**

Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution (“Regulations”): 9 VAC 5-Chapter 50, Part I, 9 VAC 5 Chapter 50, Article 1, 9 VAC 5 Chapter 50, Article 4 and, 9 VAC 5 Chapter 80, Article 6.

AP-42, Fifth Edition, Section 11.12 (Concrete Batching- dated 6/06).

New Source (minor) Review Permits Program Manual, dated September 7, 2000, as revised on April 1, 2002.

### **III. DEFINITIONS** - In addition to the definitions supplied below, the Regulations have within them definitions of regulatory terms (e.g., construction, modification) used in this procedure.

**Bin vent filter:** A passive filter typically used to control particulate matter emissions from cement storage silos, cementitious material storage silos, or weigh hoppers. A bin vent filter does not have a fan, but filters the air displaced due to the mechanical or pneumatic transport of product into the storage silo or weigh hopper. Each storage silo or weigh hopper will normally have a separate bin vent filter. The bin vent filter may have a mechanism, which operates only after the filling operation ends, to remove the accumulated material from the filter media and discharges the particles back into the process unit. Some

applicants may refer to these devices as cartridge filters, since the filtration media is modular or replaceable as a unit.

**Central mix:** A process where the concrete ingredients are mixed at the plant site and the contents are then transferred to either an open bed dump truck or an agitator truck for transport to the job site. No particulate matter emissions are expected from the discharge of the central mixer into the truck, since the material is completely saturated with water. Most of the plants permitted in Virginia are truck mix plants and not central mix plants.

**Chute:** An enclosure that extends into the truck hopper to convey materials (also known as a “sleeve,” “boot,” “shroud,” or “flexible tube”).

Note: The permit writer may change the term “chute” to any of the listed alternative terms. (The term “chute” is used in multiple locations throughout this boilerplate.) It is recommended that the term most familiar to the source be used.

**Concrete:** Most concrete produced in Virginia is considered to be hydraulic cement. Concrete typically consists of 12%-15% portland cement, 34% fine aggregate (sand), 48% coarse aggregate (<1” rock), and 6% water by weight. The proportion of water in the concrete is critical to its strength, durability, and finishing properties. Concrete batch plant operators are reluctant to add unaccounted water to the aggregate, hence wet suppression is generally not used.

**Concrete batch plant:** A concrete batch plant is a facility which stores raw materials, conveys, measures and discharges concrete mix constituents into trucks for transport to a job site. The types of concrete batch plants include truck mixed and central mixed facilities (Central mixed facilities also include shrink mixed concrete).

**Fabric Filter:** A passive filter or a forced or induced fan dust collector used to control particulate matter emissions from either a single emission unit or multiple emission units. Fabric filters may control individual emissions units or may be central dust collector systems (CDCS). CDCSs typically include a fabric filter, an enclosed bin to store collected particulate matter, and associated duct work to multiple emission units. Each fabric filter usually has a method (e.g. reverse air, pulse jet, shaker) to clean the accumulated particles off of the fabric media.

**Storage silo:** An enclosed structure, typically made of steel, but also may be made of concrete, used to store bulk portland cement, flyash, granulated blast furnace slag, or fume silica. Storage silos are almost totally enclosed, with openings for material inlets, outlets, and particulate matter control device(s), in

order to keep the materials dry and segregated. Pneumatic transport from truck or rail car is the most common method of filling the silo, although bucket elevators may be used.

**Transit truck loadout:** The point in the process where wet or dry concrete ingredients drop into the transit truck. This is a point source for particulate matter emissions found at all truck mixed concrete plants. This is not a point source for particulate matter emissions at central mixed concrete plants since the material is completely saturated with water.

**Truck mixed:** A process where the concrete dry ingredients are gravity fed from the weigh hopper and water is added into the mixer trucks. The concrete is mixed on the way to the site where the concrete is to be poured. The point where dry materials are fed into the truck can be a source of particulate matter emissions. At this point of transfer, one of the several types of chutes may be employed for the control of particulate emissions.

**Weigh hopper:** A device used to weigh coarse aggregate, fine aggregate, and cementitious material to achieve the desired proportions of ingredients and volume of concrete. The weigh hopper is a point source of particulate matter emissions.

#### IV. APPLICABILITY

1. **State Minor Permitting:** This boilerplate applies to construction, reconstruction, modification, or relocation of concrete batch plants stated in Section I of these procedures. The current Concrete Batch Plant Excel Spreadsheet as shown on DEQNet should be used to calculate the emissions from the concrete batch plant.

For new concrete batch plants, the uncontrolled, 8,760 hr/yr emissions at maximum hourly capacity should be used to determine whether a permit is required. The uncontrolled, 8,760 hr/yr emissions should be compared to the new source exemption level by emission rate per 9 VAC 5-80-1320 C.

A modification to a concrete facility occurs when there is a net emissions increase that is above one of the emission rates specified in 9 VAC 5-80-1320 D.

2. **State Toxics:** For concrete facilities subject to Article 6 permitting, a state toxics review is generally not required. Based on AP-42, Table 11.12-7 dated June 2006, a concrete batch plant would have to have an hourly capacity of greater than 959 tons/hr ( $477\text{yd}^3/\text{hr}$ ) or an annual capacity in excess of 4,213,560 tons/yr ( $2,094,215\text{yd}^3/\text{yr}$ ) to exceed the 9 VAC 5-60-300 C exemption levels.

3. **Federal Requirements:** Currently, concrete batch plants as described in these procedures, are not subject to any NSPS or MACT standard. However, if a proposed concrete batch plant includes a crusher to recycle cured concrete, the crusher and any associated materials handling/screening equipment should be reviewed for applicability of NSPS Subpart OOO provisions. Concrete batch plants are not subject to the provisions of NSPS Subpart F, Standards of Performance for Portland Cement Plants since they do not meet the applicability requirements of this Subpart, i.e. Concrete batch plants do not manufacture cement; they use cement to make concrete.

## V. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

1. Fabric filters and bin vent filters are the accepted methods of controlling particulate matter emissions from concrete batch plant storage silos, weigh hoppers, and transit truck loadouts. The Concrete Batch Plant Spreadsheet assumes that the fabric filters and bin vent filters have a 99% particulate matter control efficiency.
2. Particulate matter emissions from the truck mix plant transit truck loadout are to be controlled by the use of a chute, an enclosure and a fabric filter.  
  
**\*\*Note:** A fabric filter is presumptive BACT for truck loadout at truck mixed facilities and will normally be required. However, because BACT is a case-by-case determination, in some circumstances where rated capacity is low or throughput is limited to low levels, a water ring and boot may be approved. For this option, a cost demonstration should be provided in the application and/or engineering analysis.
3. The control of particulate matter emissions from the central plant's mixer drum are to be addressed by the permit writer based on the manufacturer's design specifications, but should include either total enclosure or partial enclosure and fabric filter to control particulate matter emissions.
4. The control of fugitive particulate matter emissions from aggregate handling and fugitive dust from haul roads, stockpiles, and traffic areas should be accomplished through a combination of wet suppression, paving, enclosures, and work practices. Wet suppression may be used as necessary to control dust from stockpiles and traffic areas. Haul roads and high traffic areas may be paved to reduce fugitive dust. Spillage on paved haul and public roads must be promptly cleaned using a method that minimizes airborne dust.

## VI. EMISSIONS CALCULATIONS

**Criteria Pollutant Emissions:** Particulate matter (PM and PM<sub>10</sub>) is generally the only criteria pollutant that requires review for concrete batch plants. PM 2.5

should not be included for review at this time since this boilerplate for concrete batch plants is for a minor source. Currently, PM 2.5 is only looked at for major sources. Other criteria pollutants may require evaluation on a case by case basis, depending on if other emission source types (e.g., fuel burning equipment) are present at the facility but those are beyond the scope of this boilerplate. Particulate matter emissions from the concrete batching operation (e.g., weigh hopper loading, truck loading, silo filling) are to be calculated using the Concrete Batch Plant Spreadsheet, which contains data from AP-42, Table 11.12-2 dated 6/06. PM-10 emissions may be used to establish permit applicability and permit limits per 9 VAC 5-80-1320(C)(3) and 9 VAC 5-80-1320(D)(3). PM emissions have been calculated in the spreadsheet as a convenience for determining PSD permitting applicability.

## **VII. MODELING**

For the majority of concrete batch plants covered under minor NSR Article 6 permits, ambient air quality modeling is not required since the anticipated PM and PM-10 emissions are less than the modeling threshold. Based on AP-42, Table 11.12-2 dated June 2006, a concrete batch plant would have to have an annual throughput of ~ 2,000,000 tons concrete/yr (1,000,000 yd<sup>3</sup>/yr) or more to exceed the modeling significance levels, based on the Concrete Batch Plant Spreadsheet.

## **VIII. PERMIT REQUIREMENTS**

1. **Permit Condition Contents:** The following subparagraphs state the requirements that have been developed specifically for concrete batch plants.
  - a. **Equipment List:** Rather than listing individual emission units/processes making up a concrete batch plant (with the exception of storage silos), the concrete batch plant and its maximum hourly production rate should be listed. All cement, flyash or other material storage silos should be listed along with their individual storage capacities. Exempt equipment may also be listed if deemed appropriate by the permit engineer. All equipment listed should have its reference numbers identified.
  - b. **Monitoring:**
    - (1) **Fabric filters:** A requirement to monitor the pressure drop across induced or forced draft fabric filters should be included in the permit. Meeting a manufacturer's recommendation for differential pressure is not considered a surrogate for meeting an opacity limitation. Both measures are required for adequate

periodic monitoring.

The permit should require the source to keep a log of the differential pressure readings on a weekly basis. The log shall include the name of the observer, the date and time of the observation, and the differential pressure reading.

- (2) **Bin vent filters**: Due to the absence of a induced or forced draft fan (i.e. bin vent filter), the requirement for a differential pressure measurement is not appropriate.
- c. **Visible Emission Observation**: The permit requires the operator to (1) make a daily, weekly, or other unit-specific frequency observations for the presence of visible emissions from the bin vent filters and fugitive emission sources and log the results and (2) visually observe the fabric filter exhaust during each storage silo loading and log the results. The presence of visible emissions shall indicate the need for prompt corrective action. The log is to include the name of the observer, the date and time of the observation, the presence or absence of visual emissions, and any corrective action.
- d. **Throughput and Production Limits**: The annual (12 month rolling basis) throughput limits should be stated in tons of wet concrete **OR** cubic yards of concrete, whichever the facility uses. The emissions evaluation is based on concrete production, so there is no need to place limits on individual processes (e.g. throughput limits on the dry products, weigh hoppers, or transit truck loadout). Generally, most operators of concrete batch plants maintain records of concrete production (tons or cubic yards), so limiting operating hours of operation for concrete batch plants is also not necessary. Other throughput or consumption limits may need to be included if other source types (e.g., crushers, diesel powered electric generators, water heaters) are collocated at the concrete batch plant facility for which a permit is sought. This will be a case by case decision using other boilerplates or guidance as appropriate.
- e. **Pollutant Emission Limits**: PM and PM<sub>10</sub> emissions of less than 0.5 tons per year are not listed in the permit.
- f. **Visible Emission Limit**: Opacity from fabric filter or bin vent filter exhaust stacks is limited to 5% as determined by EPA Method 9 (reference 40 CFR, Appendix A). Generally, no exception for startup/shutdown is appropriate.

- g. **Emissions Testing:** Particulate matter (Method 5) testing is generally not required as an initial performance test for concrete batch plants.

An initial Visible Emission Evaluation (VEE) is not required since daily, weekly, or other unit-specific frequency visual observations are being performed and logged on the bin vent filters and fugitive emission sources, i.e. the visual observations are in lieu of a VEE.

- h. **Onsite Records:** The permit is to contain a condition requiring the owner of a concrete batch plant to keep records of all emissions data and operating parameters as necessary to demonstrate compliance with applicable permit conditions. These should include at minimum:

- (1) Annual production of concrete in [{quantity} tons per year] [{quantity} cubic yards per year], calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
- (2) Operation and control device monitoring records for [each] [the] fabric filter as required in Condition(s) {condition number(s)}.
- (3) Visible emission records as required in Condition {condition number}.

2. **Notification for Relocation of Portable Facilities:** Concrete batch plants may be permitted as portable facilities. The portable plant relocation conditions and form letters have not been included in this boilerplate but should be included in the permit if the applicant requests that the facility be permitted as a portable plant. Copies of the portable plant permit conditions and form letters for notification of relocation can be found in the Minor NSR Boilerplate Directory on DEQNET.